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ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 33.] SEPTEMBER. [1889.

CVI.—FLOWERS OF CALLIGONUM AS AN ARTICLE OF FOOD IN N.W. INDIA.

The transfer to the Royal Gardens in 1879 of the economico-botanical collections formerly forming part of the India Museum at South Kensington enforced upon Kew the duty of maintaining on exhibition a complete set of specimens of Indian products. Every effort has therefore been made, with the ready assistance of the India Office, to make this as perfect as possible, and particular attention has been paid to vegetable products used for food, the nutritive value of a large number of which has been elaborately discussed by Professor Church, F.R.S., in his *Food Grains of India* (published for the Committee of Council on Education, Chapman and Hall, 1886). Supplementary analyses of articles not included in that work have from time to time been kindly contributed by Professor Church to the *Kew Bulletin* (see *Bombusa Tulda* and *Panicum flavidum*, December 1887; *Coix gigantea*, November 1888).

The use of flowers as an article of food is somewhat uncommon. Mere fugitive structures for the most part, their transitory purpose precludes the plant wasting upon them any of its carefully economised

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store of reserve-materials. It is the natural accumulations of these reserve-materials, whether in the fruit, the seed, the stem, the tuber, or the root, which mankind has learnt to appropriate and divert to its own use. And the flower is rarely available in this way. The use of Lily flowers by the Chinese, discussed in the *Bulletin* for May 1889, is scarcely an exception, as these are used as little more than a condiment. India, however, affords more than one instance of flowers having a real value as articles of food. The well-known Mahwa tree (*Bassia latifolia*) is an example. Sir Dietrich Brandis states (*Forest Flora of North-west and Central India*, p. 290) :—"The succulent flowers fall by night in "large quantities from the tree, and are gathered early in the morning ; "they have a sickly taste, and smell. They are dried in the sun, sold "in the bazaar, and form an important article of food in many parts of "India. They are eaten raw or cooked, often with parched grain, and "put in sweetmeats."

Another instance is afforded by the flowers of *Calligonum polygonoides*. Attention having been drawn to the fact that the Kew Museum contained no specimen of this curious product, the following letter was addressed to the India Office :—

ROYAL GARDENS, KEW, to INDIA OFFICE.

Royal Gardens, Kew,
April 12, 1888.

SIR,

I AM desired by Mr. Thiselton Dyer to inform you that in certain parts of India, such as Sind, the Punjab, and Rajputana, it is said that abortive flowers of a plant known locally as *balanja*, *berwaja*, and *tantuke* in Afghanistan, as *phok* or *phog* in the Punjab and Sindh, and to botanists as *Calligonum polygonoides*, L. (natural order, Polygoneæ), are used "made into bread or cooked with ghee."

2. A description of the plant is given by Sir Dietrich Brandis in the *Forest Flora of North-west and Central India*, p. 372, and by Gamble in *A Manual of Indian Timbers*, p. 303.

3. Mr. Thiselton Dyer would be glad to obtain for the Museums of Economic Botany at Kew samples of the dried flowers of the plant in question, together with any preparation of them in the form of bread or otherwise which may be available.

I am, &c.,
(Signed) D. MORRIS.

J. A. Godley, Esq., C.B.

INDIA OFFICE to ROYAL GARDENS, KEW.

India Office, Whitehall, S.W.,
June 15, 1889.

SIR,

WITH reference to the letter from this Office of the 14th May 1888, I am directed by the Secretary of State for India to forward herewith, for your information, a copy of a "Note on an article of food prepared from the flowers of the Phog" (*Calligonum polygonoides*), by Mr. J. F. Duthie, Director of the Botanical Department, Northern India, and to inform you that a tin case received from India, containing specimens of the above-mentioned plant has been sent to your address.

I am, &c.,
(Signed) C. E. BERNARD,
Secretary, Revenue and
Statistics Department.

The Director,
Royal Gardens, Kew.

[Enclosure.]

NOTE on an Article of Food prepared from the Flowers of "Phog" (*Calligonum polygonoides*).

EXTRACTS from Dr. J. L. Stewart's *Punjab Plants*, p. 183.

Calligonum polygonoides, L. Vernacular Trans-Indus, *balanja berwaja*, *tatuke*, Cis-Indus, *phok*, *phog*; flowers *phogalli*. This which is a moderately sized shrub, was first noticed by Elphinstone *en route* to Kábul, who mentions it as abundant, and notes the use to which its flowers are put from Shekhawuttee to the Sutlej * * * The plant is reported on good authority to be abundant in the Bikanir desert, but I have not seen it east of the Sutlej to the northward of that. It is not uncommon to the west of Shahpur, and for some miles north of Jhang, and is abundant in the Bari Doab in places southward from 60 miles north of Multan, and it forms a great part of the jungle westward from Mozaffargarh for some miles. It is also common near the southern and eastern skirts of Shaikh Budin, and occurs near Rajanpur in the southern Trans-Indus. I also saw it in Sind, * * * * * Cis-Sutlej, and in the southern Punjab. The flowers, having fallen off, are swept up from the ground, and used largely as food (not, however, Trans-Indus apparently). Coldstream states that in Mozzaffargarh they are made into bread, or are cooked with ghi and eaten as a relish.

EXTRACTS from Dr. J. L. Stewart's MS. *Forest Flora of Northern India*.

Common on plains, locally in various arid parts of the Punjab, Cis- and Trans-Indus, south of a line and somewhat north of the latitude of Lahore; most abundant of all for some way west of Mozzaffargarh, where it constitutes in places half of the larger vegetation, and except after showers there is almost no herbaceous growth, *Salvadora oleoides* being the other half. Also occurs in Sind along bases of hills, and although it has not been got in Ferozpur or Harriana, east of the Sutlej, is noted to be one of the most abundant and characteristic plants of the Bikanir Desert to the south, where Elphinstone in his journey to Kábul early in the century was the first European to notice it in India; also got by Griffith in N.E. Afghanistan to 5–6,000′; and grows in Persia, Arabia, Syria, Armenia, Egypt, Algeria, and the Canaries * * * * *

Grows somewhat gregariously, often on hummocks of heavier soil, and generally in clumps, like most plants in very arid soils, in the most dry and sandy places, often where the soil is very saline. Usually a small densely branched shrub 3–4 feet high, but when old, a rambling, loose, aphyllous shrub with stems 2½ feet girth at base, the branches spreading, divergent, in all directions, sometimes tree-like to 12–15 feet high, rather showy and peculiar-looking when fresh and in flower * * * * *

Its young leaves appear about February, March, and though the "verdure" of its appearance of which Madden writes is not very striking, it is a welcome and pleasing enough object in the arid deserts of North India about April, when the multitudinous small reddish pinkish flowers issue on the branches, filling the air with a strong pleasant odour as of over-ripe strawberries, and in May when these have resulted in the curious little wig-like fruit which ripens about June * * * * * * * *

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EXTRACT from letter of 2nd April 1889 from the Deputy Conservator of Forests, Multan Division, to the Director, Botanical Department, Northern India.

It appears that the flowers are gathered and used by the poorer classes only. They are cooked in two ways: (*a*) mixed with flour in the proportion of one-fourth to one-third phog flowers to flour; (*b*) separately with salt and condiments, to which those who are able add a little ghee; this preparation is eaten with the ordinary "roti" as a relish like "dál" * * *

The flowers are kept for a night in a closed earthenware vessel so as to fade, but it appears that they may be kept for a long time. I send a specimen of last year's flowers.

In Mozaffargarh the season for gathering seems to be just over, as the plants are in fruit.

EXTRACT from letter dated 6th April 1889 from Capt. G. Wingate, Assistant Commissary-General, Rawal Pindi, to the Director, Botanical Department, Northern India.

I enclose herewith a specimen of the phog bush with flowers and seeds, which I have procured from the Mozaffargarh district * * * *

Only the poorest classes use the flower as food to help out the supply of better food. They collect the flowers, keep them usually in an earthen vessel over a day, then cook them with salt or other condiments, and, if they can afford it, with ghee, and then the mass is eaten as a sort of vegetable or very much in place of the dáls eaten with rice in Bengal * * *

Sometimes the flowers are kneaded up in the thin atta, about one-fourth flowers to three-fourths atta, and baked in cakes and eaten * * *

The flowers keep well for a long time.

It will be interesting to ascertain the value of this particular kind of food, consisting as it does of the abortive flowers of a plant belonging to a family the seeds of which, as in the case of buckwheat, from the usual edible portion of the plant.

(Signed) J. F. DUTHIE,
Director, Botanical Department,
Simla, 1st May 1889. Northern India.

A portion of the phog flowers received from the India Office was placed in the hands of A. H. Church, Esq., F.R.S., Professor of Chemistry to the Royal Academy. He has obligingly furnished the results of his examination in the following memorandum.

"I have submitted the sample of *phog* to analysis in order to ascertain its nutritive value. The flowers were taken exactly in the condition in which they were received, with the single exception, that a few stalks, which would have been difficult to grind into powder, were first removed. The results of my first examination are here given:—

Water	11·0 per cent.
Oil, &c.	6·4 „
Albuminoids	16·7 „
Sugar, &c.	46·1 „
Cellulose	10·0 „
Ash	9·8 „

" The following observations may be useful in the further elucidation of the above analytical numbers. The " oil, &c." represents the per-centage of matters extracted by ether, which though usually regarded as oil or fat, really contain traces of wax, resin, colouring matter, &c. The ' albuminoids, &c.' were obtained by regarding the whole of the nitrogen present as existing In the albuminoid form. It was found, however, that by the phenol method, the per-centage of coagulate albuminoids did not exceed 12·53; this shows that, in the original flowers, out of 2·632 per cent. of nitrogen, 0·65 existed in the form of amides and similar bodies. No starch could be detected, but abundance of sugar was present; the 46 per cent. entered under this head includes, however, some gum or mucilage. The potash and phosphoric acid in the ash were both high.

" The chief peculiarity of these flowers, from a dietetic point of view, is their richness in nitrogenous compounds. The ratio of albuminoids to the carbonaceous nutrients (translated into their equivalent of starch) is as 1 to 4·8. As the corresponding nutrient ratio in rice is as 1 : 10·8, it will be evident how desirable an addition they must prove to foods which are poor in nitrogen. And if we assume 16·7 per cent. of albuminoids to be present in *phog*, then this nutrient-ratio will come out still better, namely, 1 : 3·6, a proportion which corresponds pretty nearly to that in chickpeas. It should be added that there is rather close resemblance in composition between *phog* and the seeds of the edible amaranths and buckwheats, only sugar replaces starch.

CVII.—EARLIEST NOTICE OF COCA.

In the article on Coca in the January number of the *Kew Bulletin* it was stated that the earliest account in literature of the well-known Coca plant (*Erythroxylon Coca*) " appears to be that given by Nicholas " Monardes in the third part of his *Historica medicinal de los cosas* " *que se traen de neustras Indias occidentales que serven en medicina,* " which was published at Seville in 1580, after the author's death." According to Pritzel's *Thesauras*, two previous editions of the first two parts of this interesting and remarkable work were published in 1569 and 1574 respectively ; both appear to be rare books, and are unfortunately wanting in the Kew library. The third edition, containing for the first time an additional third part, in which Coca is described, was published, according to Pritzel, by Fernando Diaz in Seville in 1580, and he calls this a posthumous edition.

The well-known botanist Dr. Ernst, Professor of Natural History in the University of Caracas, Venezuela, in a letter dated February 2nd, 1889, has obligingly pointed out the following grounds for believing that the account of Coca was published by Monardes in his lifetime, and at a somewhat earlier date :—

" With respect to Coca, I beg leave to point out that Monardes' description was first published in 1574 (Sevilla, by Escrivano). The edition of 1580 by Fernando Diaz is the second of the collected writings of Monardes. It is therefore not correct to say that this description was printed after its author's death. Monardes died 1588, as has been proved by Morejon (*Historia bibliografica de la medicina espanola*, Madrid, ii., 290). Meyer has taken from this source what he says about Monardes (*Geschichte der Botanik*, i., 412). The mistake about the year in which Monardes died comes from Antonio, who says in his

Bibliotheca hispana (Romæ, 1672, ii., 122; Matriti, 1783, ii., 154), what follows :—'Obiisse dicitur Octobris mense anno MDLXXXVIII. 'si credimus notulæ cuidam jamdiu scriptæ, ut ex characteribus 'pene evanescentibus apparet, in libri hujus *Medicinæ hispalensis* 'exemplari, quo utor: nisi deferendum sit magis tabulæ cujusdam 'altaris ad S. Leandri sanctimonalium Hispatensium, quæ Nicolaum 'Monardem anno MDLXXVIII. non obscure refert decessisse.'"

Colmeiro (*La Botanica y los botanicos de la peninsula hispano-lusitana*, Madrid, 1858, p. 28), remains in doubt as to which year should be adopted. But it is sufficiently plain from the edition of 1580 that Monardes was then still alive, for in the royal privilege (dated December 17, 1579,) he is addressed as living, and the printer's preface of this same edition ends with the wish that 'God may give a 'long life to him who by his science wishes to make long ours.' But if 1578 is therefore out of the question, 1588 is the only date to be adopted. Morejon (*l.c.*) refers to the documents of a law suit between the heirs of Monardes and one Nerozo, in which it is stated that Monardes was born about the year 1493, and died 1588, at the age of 95 years.

"There is another mistake on page 7 of the *Bulletin* (lines 8 and 9 from the bottom) instead of *Najas* (which means nothing), read *hojas*, *i.e.* leaves.

"Monardes is however not the first writer who mentions the *coca*. I have sent to the International Congress of Americanists, held at Berlin in October last year, a paper in French on the use of coca among some of the tribes in northern South America, in which I believe I have show nthat the *hayo* of Peter Martyr is the same as *Erythroxylon Coca*. His work was published in 1530, and he took the notice from the report of Fray Thomas Ortiz, who accompanied Alonso Nino and Luis Guerra in 1499 to the coast of Cumaná (Peter Martyr, Dec., vii., chapt. 6). Unfortunately some time will pass before my paper will be printed; but I shall send a copy to you as soon as I get one."

CVIII.—BUAZÉ FIBRE.

(*Securidaca longipedunculata*, Fres.)

In February of the present year Sir Villiers Lister, Under Secretary of State for Foreign Affairs, drew the attention of Kew to the fact that Mr. James Nicolls, of Mafeking on Lake Ngami, had in a report to the Colonial Office stated that "the Makouba tribe is famous for the "beautiful fish nets manufactured by them from the fibre of a species "of Cactus which grows in great abundance along the lakes and "rivers." The use of any cactus for the purpose seeming out of the question, application was made to the Colonial Office, asking if samples of the nets in question, together with specimens of the plant yielding the fibre from which the nets are made, could be obtained for the museum of the Royal Gardens.

The following correspondence gives the result of the inquiry:—

CAPE GOVERNMENT to COLONIAL OFFICE.

Government House, Cape Town,
MY LORD, April 27, 1889.

WITH reference to your Lordship's despatch No. 68 of the 4th ultimo, I have the honour to enclose, for your information, a copy of a letter which I have received from Mr. James Nicolls, forwarding a

specimen of the fishing nets made by the natives living round Lake Ngami.

The net which accompanied Mr. Nicolls's letter has been forwarded by parcel post.

I have, &c.
(Signed) HERCULES ROBINSON,
Governor and High Commissioner.

The Right Hon. Lord Knutsford, G.C.M.G.,
&c. &c. &c.

Mr. NICOLLS to Sir H. ROBINSON.

British Bechuanaland, Mafeking,
YOUR EXCELLENCY, April 16, 1889.

I HAVE the honour to acknowledge the receipt through Sir Sidney Shippard of certain communications from Lord Knutsford and the Director of the Royal Gardens, Kew, in reference to fish nets made by the natives around Lake Ngami and mentioned by me in a report made for your information some time since.

I have much pleasure in now forwarding by post this day a specimen of the nets in question, and should feel happy if the authorities at Kew would be willing to accept some. The net I sent is the joint property of Mr. Robert Hicks of this place and myself. Some months since I sent a much finer specimen to Mrs. Nicolls, Belmont, Navan, county Meath, Ireland, and I have not the slightest doubt but that she would be only too willing to present same to the Royal Gardens, if application were made for it.

I beg to forward for information a short description of the plant from which the nets are manufactured.

I am, &c.
(Signed) JAS. A. NICOLLS.

The Right Hon. Sir Hercules G. Robinson, P.C., G.C.M.G.,
&c. &c. &c.

Enclosure.

FISH NETS from LAKE NGAMI and the BOTLETLE RIVER.

The fibrous plant from which the Makouba tribes make their nets is found very abundantly on the shores of Lake Ngami and on the Botletle, as far east as the point where the river bends directly southward. It flourishes in the dense shade afforded by forest trees on the margin of the lake and river banks, and is never discovered growing at at a distance of over 300 yards from the water. The plant itself, especially along the river, grows in impenetrable masses, attaining at most a height of about 5 feet. The stems, or, more properly, stalks, averaging about 1 inch in diameter, the points of such stems being furnished with a wonderfully sharp spear-like head. The fibre is rather thicker than that obtained from flax, and when freshly drawn from the stack very closely resembles fine fishing gut. In fact it has been most successfully used for angling purposes in the Botletle River. It can be fairly stated that the stalk, in the raw state, is fully as tough, if not tougher than a Manilla rope manufactured of the same thickness.

No criterion can possibly be arrived at as to the durability of this fibre from the specimen of net forwarded to the Royal Gardens, Kew, as the Makouba tribes do not take the slightest trouble in drying their

nets after using them. It may be interesting to note that in the impenetrable thickets formed by the plant, that beautiful and rare specimen of the spotted bush buck of the Cholie and Botletle Rivers finds secure refuge from the attacks of man and wild beasts.

(Signed) JAMES NICOLLS.

Mafeking, 16th April 1889.

N.B.—Mr. Nicolls, on his return from Lake Ngami, at the close of the present year, will be most happy to furnish the authorities at Kew with specimens of the roots and stalk of the plant in question. At the same time he has to express his regret that, owing to the carelessness of the man in charge of his waggons, on his journey from Lake Ngami last year, the entire number of specimens of plants, &c., with very few exceptions, have been unfortunately lost.

From the description of the plant given by Mr. Nicolls, it was impossible to form any idea as to what its botanical affinity might be. Upon examinining the fibre, however, and comparing it with some nets from the same locality already contained in the Kew Museum, and made from the fibre of *Securidaca longipedunculata*, Fres., it was found to closely agree. The plant is a much branched divaricate shrub, sometimes growing to a height of 8 to 10 feet, belonging to the natural order *Polygaleæ*, and distributed through Upper and Lower Guinea, Nile land, Mozambique district, &c. Two kinds of fibre appear to be furnished by the plant; one from the bark of the twigs is very strong and durable, and would seem to be the fibre from which the nets are made, known in Zambesiland as Buáze fibre; the other from the stem, cross sections of which show layers of fibrous bark between layers of wood.

Buáze fibre seems to have been first introduced to notice by Dr. Livingstone in 1857. In his *Missionary Travels and Researches in South Africa*, published in that year, he says (p. 645) that he submitted a small quantity of the fibre to Messrs. Pye Brothers of London, who reported from 80, Lombard Street, under date 20th March 1857 :—"The Buáze evidently possesses a very strong and fine "fibre, assimilating to flax in its character, but we believe when treated "in quantity by our process it would show both a stronger and finer "fibre than flax; but being unable to apply the rolling or pressing "processes with efficiency to so very small a quantity, the gums are "not yet so perfectly extracted as they would be nor the fibre opened "out to so fine a quality as it would then exhibit."

The opinion obtained by Messrs Pye, Brothers from Messrs. Marshall of Leeds was as follows :—"The Buáze fibre appears to resemble flax, "and as prepared by you will be equal to flax worth 50*l.* or 60*l.* per "ton, but we could hardly speak positively to the value unless we had "one cwt. or two cwt. to try on our machinery. However, we think "the result is promising and we hope further inquiry will be made as "to the probable supply of the material."

Dr. Livingstone adds that the plant is stated to grow in large quantities in the "Maravi country, north of the Zambesi, but it is not cultivated, "and that the only known use it has been put to is in making threads "on which the natives string their beads. Elsewhere the split tendons "of animals are employed for this purpose. This seems to be of equal "strength, for a firm thread of it feels like catgut in the hand, and "would rather cut the fingers than break."

Dr. Livingstone's original fragmentary specimen of the Buáze plant, which consisting merely of foliage was indeterminable at the time, exists in the Kew Herbarium. The botanical identification is due to Sir John Kirk, G.C.M.G., late Political Agent at Zanzibar, who during his attachment to the Livingstone South African expedition in 1859, and to the Zambesi Expedition in 1861, obtained an excellent series of specimens both in flower and fruit. The Buáze plant is well figured by Richard in his Tentamen Flora Abyssinicæ, t. 10, under the name of *Lophostylis angustifolia*, and by Klotzsch in Peters's Mozambique, t. 22, as *Lophostylis pallida*. Both names now give way to that at the head of this article.

Notwithstanding the comparatively favourable report on this fibre received so far back as 1857, nothing has since been done to further its utilization in this country.

CIX.—VEGETABLE PRODUCTIONS, CENTRAL CHINA.

There is no part of the northern hemisphere of which the flora has hitherto been so imperfectly known as the Chinese empire. The late well-known botanist Dr. Hance remarked in 1874:—"Whilst M. "Maximowicz's excellent and very complete *Index Floræ Pekinensis* "provides a good catalogue of the flora of the Chinese metropolis and "its vicinity, and Mr. Bentham's classical *Flora Hongkongensis* "has acquainted us with the principal constituents of that of the "extreme south-east of the empire, nothing whatever of a scientific "character has as yet to my knowledge been written on the vegetation "of the districts intermediate to these two points, which are separated "by 17 degrees of latitude, or of the various ports of trade along the "coast, or on the Yangtse."

In order to remedy this state of things the first step seemed to be to catalogue the notices of Chinese plants scattered through botanical literature and to enumerate in systematic order the species of which specimens collected by travellers in China were to be found in the Herbaria of the British Museum and of Kew. For this purpose a small Sub-Committee was appointed by the Government Grant Committee of the Royal Society (it has also received several grants of money from the British Association). The work was at once taken in hand at Kew, Mr. F. B. Forbes, F.L.S., who had long resided in China, having very generously placed in the hands of the Committee the manuscript collections which he had made with a similar object. As the catalogue has been compiled by Mr. W. B. Hemsley, F.R.S., Assistant for India in the Kew Herbarium, it has been set up in type and copies distributed to every European resident in China who was likely to be able to help. The Linnean Society assisted the work by publishing the *Index Floræ Sinensis* in its Journal and paying the cost of illustrations of the most interesting undescribed novelties. The result has been to stimulate an amount of activity in the exploration of the Chinese Flora which has far exceeded expectation. A profusion of collections of the greatest value and importance has poured in, and there is some risk that it may be difficult to compress the undertaking within the modest limits which were at first contemplated.

The first part was issued May 20, 1886. Two parts have been regularly published in each year since that date, and the seventh part, bringing the enumeration down to the *Loganiaceæ*, was issued April 30 last.

The work not merely brings to a focus all that it is accurately known about the natural vegetation of the Chinese empire; but it has the further convenience of serving as a catalogue of all the species of Chinese plants which up to the date of the appearance of each part were represented by specimens in the Herbaria of the Royal Gardens and of the British Museum.

To no one is the progress of the undertaking more indebted for the supply of copious and admirable material than to Dr. Augustine Henry, an officer of the Chinese Imperial Customs. Till the beginning of the present year he was stationed at Ichang on the Yang-tse-Kiang in the province of Hupeh, a position almost in the exact centre of China.

In the following letter Dr. Henry gives an interesting account of one of his more extended expeditions :—

My dear Sir, Ichang, China, 9 October, 1888.

I have just returned from my second trip, having been away about two-and-half months. I travelled due north from Ichang till I reached the range separating the basins of the Yangtze and Han rivers, and then I made my way along the range westwards as far as Szechuen, striking then the Yangtze on the Hupeh-Szechuen boundary line I returned two or three days ago by boat down the rapids.

I am now busy preparing a set of my collections of both trips, with those obtained by four natives working separately in three different localities. I consider it of importance to get these off as soon as possible so that they may be put into the *Index Floræ Sinensis*, the *Compositæ*, for example, will, I think prove, rich in novelties.

I reached at one point about 10,000 feet altitude, and found the mountains from 8,000 to 10,000 feet rich in plants not previously sent. The primeval forest still remains in parts, though sadly cut and burnt down by the cultivators of potatoes and the opuim poppy, the only crops grown. Many interesting conifers occur in this zone, one being a tall slender tree, perhaps 100 to 150 feet high, which originally clothed all the top of the range. Four *Ribes* also occur, one being an excellent gooseberry, a *Betula*, many Acers, curious *Rubi*, a *Fragaria* (like *vesca*), and some pretty Alpine plants. I also found what I take to be *Diphylleia Grayi*, an interesting addition to the Chinese flora. I also send many Roses and Viburnums. In these high regions many of the most important Chinese drugs occur of which the origin has been hitherto unknown. Rhubarb is dug up by the peasants. This *Rheum* is a tall handsome plant only occurring at above 8,000 feet in the wild state. In the mountains round Ichang I had hitherto only seen it cultivated, and that on a very small scale, one or two plants in the peasants' gardens. So far as I can judge the main source of the rhubarb exported to England is the range on which I was travelling, in its extent from N.W. of Ichang to the frontier of Thibet, along the boundary line between Szechuen and Shensi.

Huang lien (*Coptis Tecta*, Wall. ?) occurs cultivated. A rude staging about 400 feet by 400 feet is erected on the mountain side (6,000 feet to 9,000 feet altitude) composed of trunks and branches of trees driven into the ground, about 4 feet high, and across the tops of these poles other branches are laid horizontally, so that the sun will only glimmer on the plants growing beneath. After eight years' growth the root is large enough, and is then dug up and exported to all parts of China.

T'ang shên is another important drug, a member of the *Campanulaceæ*, a large twiner akin to *Codonopsis*.

I might mention many other drugs, but with the specimens I shall send ample memoranda descriptive of them. Of *Aconitum* and *Allium*

I have many species. Of an *Aralia*, like ginseng in habit, I have three or four varieties, which may be distinct species. This is known as *San-ch'i*, the name of a famous drug for use in wounds.

I had a very pleasant trip, being on excellent terms with the people. The *fauna* would also, I think, prove interesting, there being a very large antelope (nearly as big as a cow) with a white mane on the neck; two bears; wild boar; large monkeys; badgers, or animals resembling them, and several kinds of pheasants.

The so-called "wild cow" (*Budorces*), does not occur in this part of the range, but further west it is said to exist. The Chinese also speak of a "wild horse," described as being about the size of an ass, which formerly existed in this part of the range, and I have no doubt some animal of this kind (perhaps the origin of the "unicorn") will be found on the wilder parts of the range. We are trying to get a specimen of the splendid antelope alive to send to the Zoological Gardens, the skin which I bought being insufficient for scientific purposes.

No foreigner, not even the Roman Catholic missionaries, had ever been in these parts before; and not a single article of English manufacture was in use, foreign goods only being used as a rule by the better classes in towns and in the richer country districts.

I am, &c.

(Signed) Augustine Henry.

CX.—VINE CULTIVATION IN THE GIRONDE.

In October 1881 the present Director of the Royal Gardens attended the International Congress at Bordeaux as representative of the Governments of New South Wales, South Australia, and Victoria. In the report upon the proceedings which was subsequently presented to these Governments, the opinion was expressed that, though various remedial measures had been proved to be efficacious in keeping the ravages of the Phylloxera under control, various practical difficulties, especially that of expense, would in the long run limit their applicability to vineyards producing wine of the highest quality. The problem of the continued existence of the general cultivation of the vine in France, and indeed in any country which has been infected with Phylloxera, seemed most likely to be solved by the use of American vines as stocks.

The following summary of the conclusions upon this point which were gathered from the deliberations of the Congress may be conveniently reproduced from the report which the Director made to the Governments he represented:—

"The Phylloxera and the American vines have grown up together in the New World. As the latter have not been exterminated, it follows that they have arrived at a mutual adjustment. The injury to the roots produced by the former, which in about eight years after the first attack destroys the vines in a European vineyard, the American vines are able to withstand and repair. I myself saw American vines growing in the Botanic Garden at Bordeaux to all outward appearance in perfect health, yet when the roots of these were exposed they were swarming with Phylloxeras. It is indeed believed that the invasion of France by the pest is due to the importation of American vines about 1862. The use of American vines in districts thoroughly infected with Phylloxera was eagerly supported by the vine-growers from the south, but was received with less favour by those of the west of France. The vines are used

either as "direct producers," or as stocks on which European vines are grafted. The American vines which are in most favour as "direct producers" are the kinds called Jacquez and Herbemont; these are varieties of *Vitis æstivalis*, and the fruit is destitute of the "foxy" taste which is characteristic of varieties tracing their parentage to *Vitis Labrusca*. Branches of the Jacquez vine were shown laden with grapes in an extraordinary manner, and there can be no doubt that it is a vine of great fertility. Both Mr. Trimen [the representative of the Cape Government] and myself were at the pains on more than one occasion to taste numerous samples of wine made from both Jacquez and Herbemont grapes. To our taste these wines were far from palatable, being exceedingly acid, with a peculiar mawkish flavour. Of course they were very raw, but may improve after being kept for some time. Wine made from Jacquez grapes had evidently considerable body, and its extraordinary rich colour was immensely admired. That made from Herbemont grapes is said to be inferior in strength, but to have a more delicate flavour. It was supposed that these wines would, to a considerable extent, replace the coarser kinds of *vin ordinaire* and *vin du midi*, but my own impression was that the kind of merits which were most appreciated in them were those which would fit them for the processes of blending and mixing which now go on to such an immense extent in France.

"Both the Jacquez and Herbemont vines are put to a better use as stocks for grafting European vines. The Jacquez answers well for this purpose in the south, and its range of cultivation corresponds roughly with that of the olive. In the Bordeaux district it did not seem to do so well, and Herbemont is relied upon. The Riparia variety of *Vitis cordifolia* seemed, however, to be most in favour. The Bordeaux wine-growers viewed the whole question of American vines with the greatest impatience, while those from the south were quite enthusiastic about it. Some of the later discussions in the Congress assumed great animation in consequence, especially as the advocates and detractors of American vines seemed to belong to opposite political parties.

"For my own part, I have not the least doubt that the use of American vines, at any rate as stocks, affords the only chance of maintaining vine-cultivation in the future in Western Europe. There seems to be no apprehension that even in the case of vines producing the finest wines the influence of the stocks upon the grapes borne by the vines will be injurious. The only doubtful question was that of how far productiveness would be affected. Here the most opposite opinions were expressed. Some pointed to the generally received fact that grafting increases the productiveness of fruit trees, while others asserted that as a result of actual experience, the yield in the case of the vine is diminished. However this may be, it remained perfectly clear to my mind that when a vine-growing country has once become thoroughly infected with Phylloxera, and where submersion is impracticable, and the use of insecticides too costly, the employment of American vines, whether as direct producers or as stocks, is the only practicable mode of saving the industry."

It will be both useful and convenient to compare with these opinions expressed three years ago, the account given by H.M. Consul at Bordeaux in a report to the Foreign Office, dated March 15th of the present year, of the actual condition of the vine industry in the Gironde. It will be seen that while the actual cost of fighting the Phylloxera by means of insecticides in freshly infected vineyards has been immensely

reduced and rendered practicable, where it would have been unremunerative eight years ago, the regeneration of vineyards in which the European vine had been extirpated by the Phylloxera has been effected, as was pointed out would probably be the case, by means of European vines grafted on American stocks. Direct production from American stocks has, fortunately for the wine consumer, been abandoned as hopeless.

"According to an estimate recently published the total area of vineyards under cultivation last year in the Gironde department was 349,817 acres; being an increase of 6,292 acres compared with the same period of the year 1887, in which latter year there had been a diminution in the acreage of wine-growing land as compared with 1886

"Though the figures showing the acreage of vineyards during 1888 are almost the largest ever reached and considerably larger than those attained about 10 years ago, it is necessary to observe that about one-half of the said 349,817 acres are still more or less infested with the *Phylloxera*; and it will thus be rendered evident that this destructive insect continues to do much havoc in the vineyards of this, as well as of most other parts of France. But it is nevertheless the opinion of experienced viticulturists in this country that, upon the whole, the prospects of the French wine-growers are looking brighter than they have done at any time since the appearance of the *Phylloxera* twelve years ago; it may be added that, as regards in particular the Gironde department, the outlook certainly must be called hopeful at present.

"For not only will doubtless the late abundant vintage give a fresh impulse to their energies and provide fresh means for the pockets of many proprietors who until lately have been hesitating or unable to employ the proper remedies for combating the *Phylloxera*, or recultivating their devastated land, but the fact, above referred to, that already last year there was a large increase in the annual extent of fresh plantations of vines, must be regarded as a favourable sign.

"These new plantations consisted almost exclusively of American vines, grafted with French plants of the best kind. Though this method of recultivation is more expensive than the direct production by American plants, it has to be resorted to in this district whenever purely French vines are not planted, inasmuch as the quality of wine obtained from American vines not grafted with French is of too inferior a description to be saleable here.

"A further reason for greater hopefulness amongst all interested in the wine trade and production of this district may be found in the circumstance that the measures now employed in combating the inroads not only of the *Phylloxera*, but also of all other cryptogamic diseases of the vines, are annually becoming more perfected, more known, and less expensive.

"The Agricultural Society of the Gironde recently published a statement showing the average costs incurred last year by proprietors in this department in employing the best known remedies, viz.: (1) against the *Phylloxera*, bisulphide of carbon; (2) against *Mildew*, the so-called 'Bouillie Bordelaise,' a mixture of 3 lbs. of sulphate of copper, with 1 lb. slaked lime and 22 gallons of water; (3) against *Oidium*, sulphur; and (4) against *Anthracnosis*, a mixture of 80 lbs. of sulphate of iron and 10 lbs. sulphate of copper. The total cost of using all these remedies is said to have amounted on an average to about 31*s*. per acre, an expense which cannot be called excessive, especially when it is added that their application served at the same time as a preventative against snails and slugs which also often do much damage to the vines.

"The employment of the so-called 'Bouillie Bordelaise' for preventing the vines from being attacked by mildew has become more and more extensive of late, in view of the successful results obtained; and many persons are of opinion that the abundance of the 1888 vintage was in a great measure due to the widespread use of this remedy in the vineyards of the Gironde. On the other hand, it must be mentioned that the use of the 'Bouillie Bordelaise,' a mixture (as above described) of sulphate of copper and slaked lime, has given rise to some apprehensions amongst the public at Bordeaux. For many persons cannot dispossess themselves of the view that the liquid in question—which is sprinkled upon the leaves of the vine—must have some effect upon the wine produced from the latter; and it is feared by them that not only may the flavour or other qualities of the wine be thereby possibly affected in an unfavourable manner, but that injurious effects may also arise therefrom for the health of the consumers. The sudden illness shortly after the end of last year's vintage of a large number of persons who had drunk wine known to have been produced in vineyards near Nimes, where the 'Bouillie Bordelaise' had been employed (an illness which was subsequently, however, proved to have been caused by other reasons), was at first ascribed in this and other parts of France to the noxious effects of the sulphate of copper contained in the mixture mentioned, and this added strength to the belief as to its dangerous qualities if employed against mildew. Though I have already on a former occasion taken the opportunity of dwelling upon this subject, it may, in the interest of the British consumer of Bordeaux wines, be again observed that many and carefully made analyses made here have fully proved that wines made from vines sprinkled with the 'Bouillie Bordelaise' are not injurious to health. For it has been repeatedly found that the quantity of copper contained in such wine does not exceed three-tenths of a milligramme per litre; or, in other words, a consumer before absorbing a maximum quantity of 45 grains of copper would have to drink at least 2,000 gallons of wine produced from such vines. According to scientific experiments this trifling amount of copper is in fact not greater and probably less, than the per-centage thereof contained in some other articles of daily food which are admitted into the human body without injurious or unpleasant effects. How far, on the other hand, the use of the 'Bouillie Bordelaise' may have already affected, or will affect, the flavour and some other qualities of the wine derived from vines sprinkled with it, is a question which to my knowledge has not yet been definitely settled."

CXI.—PHYLLOXERA IN SOUTH AFRICA.

At the time of the International Phylloxera Congress at Bordeaux in October 1881 there was no evidence to prove that the Phylloxera had invaded South Africa. Mr. Roland Trimen, F.R.S., F.Z.S., Director of the South African Museum, was, however, delegated as representative of the Government of the Cape to the Colony, and he reported upon its proceedings December 29, 1881. In the 25th paragraph of his report, after having fully discussed the matter with the late Professor Planchon, the most eminent authority on the subject at the time, he stated:—

"I am entirely in favour of reasonable precautionary measures, and I think that those which Professor Planchon recommends are fully

sufficient. The total exclusion of all vines should be maintained; the admission of all other plants from countries where Phylloxera in the vine does not exist should be allowed; and the admission of plants other than vines from phylloxerized regions should be conditional as satifactory certification that they have not been grown in the immediate vicinity of vines."

It can hardly be doubted that had it been possible from the first to enforce such regulations efficiently, South Africa would have remained free from the ravages of the Phylloxera. Nevertheless, it appears from the evidence of Mr. Louis Peringuey before the Select Committee of the Cape House of Assembly on the Vineyards Diseases Act (presented with their report, July 29 of the present year) that the insect was first identified by him in South Africa on January 1, 1886. "It came from Kotze's at Mowbray." [Qs. 936 and 937.] This is in the neighbourhood of Cape Town.

The infection of the Cape vineyards is now unhappily thoroughly established. The Cape Government have, however, done the only thing possible, and have obtained the assistance of a most competent authority to advise them in M. P. Mouillefert, Professor of Viticulture in the French National School of Agriculture, Grignon. The following able "Report upon the Vineyards of the Cape Colony" is reproduced from the *Agricultural Journal*, published by the Department of Agriculture of the Cape Colony for May 2, 1889. Treating as it does of so important a cultural industry in one of our principal colonies, it will be conveniently made accessible for wider reference in the pages of the *Kew Bulletin*:—

"Sir, "Cape Town, 30th March 1889.

Having been deputed by the French Government, in accordance with your request, to come and inspect the vineyards of the Cape Colony, as regards their protection from the Phylloxera, I entered upon this duty immediately after my arrival. In company with Professor Fischer, the Secretary for Agriculture, and M. Peringuey, Inspector of Vineyards, I visited the principal wine-farming centres, and now have the honour of submitting to you the observations I have made, and the conclusions to be drawn therefrom.

"Although the existence of the Phylloxera in the vineyards of the Colony was not verified officially before the year 1886, the disease is, in my opinion, of much earlier date, and in accordance with Mons. Peringuey, who has made a special study of the question, I consider that the invasion of this destructive insect should be approximately fixed at about the year 1880.

"I shall say nothing respecting its introduction into the Colony. That seems to be a question which will never be definitely decided. On the other hand, I had no difficulty in observing that the Phylloxera, as was to be expected, had run the same course here as in Europe, that its peculiarities have been the same, and that its effect upon the vine has been identical; all these data being well understood. But there is this very important difference, that, owing to the mildness of the climate of the Cape, there is, all the year through, no check to its reproductive powers, and consequently its increase is far more rapid than in Europe. It has also been ascertained that the production of winged females, whose special function is the wide dispersion of the species, lasts for a much longer time here than in the northern hemisphere, that is to say, for nearly four months; while in France such production is spread over no more than eight or ten weeks. It is recognised, also, that the mildness of the climate and the great heat of the summer, far from checking the parasite, actually favour it. Hence the defensive position

of the vine in the colony is decidedly inferior to that which it holds in colder climates where the soil is not so dry during the period of vegetation.

"The mischief having been once clearly ascertained, what action should be taken in the matter? It was obviously reasonable to follow the method adopted in France, where the problem has been studied these twenty years past by men who, from a scientific point of view, are thoroughly competent and whose labours are well known. This wise course has been chosen instead of delaying action by the repetition of studies already worked out, and experiments made long ago, and upon which definite conclusions have been founded already.

"It was prudent also, to take count of the local conditions, which are very different here from those existing in France. There wine farmers are of old date, and well supplied with cultural appliances which are out of the reach of the Cape Viticulturist. Hence it follows that remedial measures of proved efficacy in Europe, such as submersion, the employment of bisulphide of carbon, and the alkaline sulpho-carbonates, could not be universally applied here. The same thing may be said of the reproduction of the vines upon American stocks, a method which requires a staff of experts for the operation of grafting, the most careful attention and considerable outlay, and even then with no absolute certainty of success. Nevertheless, I have been gratified to observe that the Cape Government has in this direction had the foresight to establish, by means of seedlings, a nursery of phylloxera-proof stocks, which may be turned to account when needed.

"But all the measures hitherto indicated do no more than establish a *modus vivendi* between the vine and its enemy, without completely exterminating the latter. Hence follows the necessity of destroying the insect outright, if possible, by the extinction of its original centre of production—in a word, by destroying all contaminated growth.

"In France this drastic mode of procedure, proposed in 1873 by the Phylloxera Commission, unfortunately could not be carried out. It was already too late. The mischief was too widely spread, and no one at that time put into practice the methods of destruction and disinfecting the soil which have subsequently had their trial.

"But in Switzerland, and also in Algeria, this procedure, recommended by the Commission in 1873, had been eminently successful, although in the latter country its application was merely tentative. Not only is the progress of the plague arrested by the uprooting of the original centres of production after the insect has been destroyed, but a stop is put to the numerous winged swarms which would proceed from the infected stocks, and would for several years continue to proceed from thence, to found at a distance new colonies, in numbers ever increasing, like the terms of a geometrical series. So rapid is this progression, that the original point of infection in the south of France spread in six years over an area of 30,000 hectares (= 37,500 Cape morgen) and in ten years had covered 15,000,000 hectares (= 10 million Cape morgen). The inevitable result has been a period of enormous disaster. The average production of wine has decreased by upwards of 20,000,000 of hectolitres (= nearly 3,000,000 leaguers) and this means a loss in money value of more than 1,000,000,000 francs, without taking into consideration the depreciation in the value of viticultural property consequent upon the failure of returns.

"In the Cape Colony, the Government, warned by the foregoing facts, has, to its great credit, promptly entered into the contest upon the only satisfactory basis. The manner in which that struggle has been

carried on reflects great credit on the Phylloxera Commission, and especially on M. Peringuey, to whom has been allotted the duty of practically carrying out the method adopted—a method of which he has been a most ardent advocate, and one which he has not shrunk from applying to an extent hitherto unknown in any country, regardless of the risk of personal unpopularity.

"Considering that the vineyards of the Colony are sufficiently isolated from each other, there was all the more reason to follow this line of procedure, particularly as there exists no neighbouring nations by whose instrumentality the pest might hereafter be re-introduced. The expenditure incurred in this contest has necessarily been considerable, but, when the results achieved are compared with the cost, it will be easy to show that the measures taken have been consistent with the best interests of the wine-farming proprietary and of the colony generally, while the Parliament and the Government cannot be too highly congratulated upon what has been effected.

"In point of fact, the area of this phylloxeric invasion either actually extends over, or threatens, about 70,000,000 vinestocks, the extent of 10,000 hectares (12,500 morgen) of land. According to the last official statistics, these produce on an average 5,119,608 gallons (=40,312 leaguers) of wine, having a mean annual value of 131,952*l.*; and 10,945 leaguers of brandy, worth 164,175*l.*; besides about 200,000 lbs. of raisins, valued at 2,500*l.*, giving altogether a total of 298,627*l.* Including sundry accessory products, the output may be stated as not less than 300,000*l.* sterling per annum.

"Hence, with a full knowledge of what has been experienced in France, and keeping in view that the climate of the Cape is, in comparison, even more favourable to the spread of the disease, it may be affirmed that, but for the energetic measures of repression which have been taken, *the vineyards situated in the aforesaid area would by this time have ceased to exist, or would be compromised to the last degree, and with them the entire wine-district of the Colony.*

"Now, if the results obtained be balanced against the expenditure incurred, it will incontestably appear that the action taken has been of the highest advantage to the country. The average annual returns of the vineyards threatened with destruction exceed by thirty-fold* the expenses disbursed in the whole three years of anti-phylloxeric treatment, while the productive capital stock has been preserved almost in its entirety.

"Nevertheless, considering the outlay inevitable in the contest, a prudent Government might reasonably put the question whether it is advantageous to continue such expenditure, or whether it would not be preferable to leave to the wine farmers themselves the option of defending or not defending their vineyards. But, under the latter alternative, would there not be good reason to fear that the colonial wine farmer, if left to his own resources, would make no effort to save his property from destruction? And if this unfortunate result should follow, as one may well believe it would, a great disaster would assuredly befall the Colony, seeing that the well-being of the whole community is indissolubly bound up in that of the individual.

"It is on these grounds that I have no hesitation in declaring that it will be to the interest of the entire Colony that the Government should persevere in maintaining the hand-to-hand contest with the enemy which it has hitherto done with so much success. By pursuing this

* The value of the total yield for three years 900,000*l.* in comparison with the expenditure during the same period on anti-phylloxeric treatment.

course, not only will the actual extirpation of the plague be within the bounds of possibility, but there will be the certainty, supposing only the minimum results be attained, of so thoroughly checking its advance, that the future annual expenditure charged upon the country will be but a small fraction of the pecuniary interests protected. Such outlay will be a sort of premium of insurance against the evil, guaranteeing to the Colony a yearly income of 300,000*l.*, which represents a capital stock of certainly not less than 3,000,000*l.* sterling. And it may be further pointed out that the market value of landed property in the wine-producing districts depends not so much on the number of morgen as upon the number of vines it will carry.

"Add to all this that the struggle will be all the more easy of maintenance, since the Phylloxera Service has been in every respect well organised, thanks to the zeal, energy, and great ability of M. Peringuey; the expenditure for tools and appliances used in the distribution of the bisulphide of carbon has already been made; the staff employed in extirpation and inspection (and I have seen it at work) is well trained and reliable. All these circumstances combined admit of the work being carried on henceforth with great economy, and at the same time under the best conditions for securing efficiency.

"Be it understood, however, that if the method pursued is to give all the results of which it is capable, there must be the power to apply it with a free hand in every case where it is deemed necessary. There must be no hesitation in applying, as it were, the actual cautery to the wound, and in enlarging the protective zones, especially in the direction of the boundaries of the phylloxeric invasion.

"The staff employed in inspection occupies a highly responsible position, for on it, to a large extent, depends the success of the operations. Independently of the careful examination of all vine stocks in regular routine, the head of the staff should find means of ensuring a still more exact scrutiny of all suspected localities, as well as of the vines in the neighbourhood of those that have been pronounced affected.

"I have been pleased to observe that this is being done, and that M. Peringuey's instructions were perfectly understood. It is scarcely necessary to say that it is of the greatest importance that the visitation of the vineyards should take place each year, as is the rule elsewhere, before the swarming season of the Phylloxera, and the same precaution holds good with regard to measures of eradication.

"Turning to another aspect of the question, the permission to replant a destroyed vineyard after the lapse of a specified time, is a matter of great moment. The length of this period will, of course, vary according to circumstances, specially with regard to the distance from other vineyards, the aspect, the situation, and the sort of culture which has followed the eradication. I think that, in general, the replanting may be permitted after three or four years' fallowing, if the spot to be replanted is situated not less than 10 to 12 kilometres (6 or 7 miles) from the nearest phylloxerized area. To this end I think it would be well if the Government had nurseries of the best sorts of vine plants established in perfectly uninfected localities, and were to arrange that these plants be delivered on stated conditions to such proprietors as might wish to establish vineyards either in unphylloxerized districts, or to replant those which had previously been destroyed in the common interest.

"It appears to me that, with this combination of measures, the end aimed at may be attained in a manner advantageous to the wine farmers, and in accordance with the best interests of the country, and for this it

is only necessary to persevere in the course which has fortunately been adopted.

"I take leave in this report to call the attention of landed proprietors in the viticultural districts to certain points in the management of their vines, and above all to the manufacture of the wine itself. Speaking generally, I have found the wines of the Cape possessed of qualities of a remarkable and even unique kind, which, if they were known, would cause them to be appreciated all over the world. But, such as they are, that is to say, possessed of great alcoholic strength, they certainly are best fitted for consumption in the comparatively cold regions of Europe and America, nor does it seem to me impossible to cause them to be appreciated at their true value in those countries. On the other hand, for places where the temperature is somewhat high, and for the Colony itself, the wines of the Cape are far too heating. They can only be partaken of in small quantities, and therefore are not sufficiently refreshing. The consequence is that other beverages are preferred, notwithstanding their high price and inferior intrinsic value. If Cape wines could be prepared with a uniform strength of 11° to 12° only, instead of 18° to 22° as is now done, I doubt not that we should witness a rapid rise in the average consumption, and this would tend, as a natural result, to a considerable increase of the output, and give a very decided impulse to the colonial wine industry.

"Such a state of things is, I think, quite attainable. It will be necessary, in the first place, to compel the vines to carry a heavier crop by allowing a greater length to the bearing shoots, or by arranging from the first to have stocks of a considerably greater height. Secondly, the gathering must take place earlier than is usual, that is to say, at a stage when the grapes are less ripe or even somewhat acid. Thirdly, the fermenting house must be cooler, a condition to be attained by constructing the basement partially underground, building thicker walls and more substantial roof cover, as a protection against high temperature. Fourthly, close fermentation, carried on in casks, not in open tubs, and also apart from the husks, is essential. It is with satisfaction that I have observed these methods already in use at the viticulturist school at Constantia, as well as in several private establishments, a beginning which will be fruitful of good results. The samples of their production which I have tasted incontestably prove the possibility of making in the Colony excellent wine of low alcoholic percentage.

"It has also struck me that many vineyards are not producing as much as may reasonably be expected of them, having regard to the growth on the stocks and the depth of the soil. I think that under these circumstances a top-dressing of lime, in some form or other, with an addition of phosphates, would considerably augment the returns, At Robertson and Montagu, where the vines (on a calcareous soil) are duly manured and irrigated, it is easy to obtain a return of twenty leaguers per morgen, whereas at Paarl only seven or eight leaguers are obtained, and at Stellenbosch not more than three or four is the average

"These are the views, sir, which I find myself able to report in all frankness upon the subject of the honourable mission which has been confided to me, and it will afford me great gratification if my humble words gain attention, and are found to be of service to the highly important interests of colonial viticulture.

"I have, &c.

"P. MOUILLEFERT."

CXII.—ERRONEOUS REPORT OF PHYLLOXERA IN GREECE.

The Foreign Office has communicated to this establishment the following despatch from the British Minister at Athens denying the correctness of the reported appearance of Phylloxera in the Morea. The appearance of the insect in Asia Minor was recorded in the *Kew Bulletin* for March of the present year and its further possible extension in the Eastern Mediterranean cannot but be a ground for the gravest anxiety.

Sir E. Monson to the Marquis of Salisbury, K.G., &c. &c.

My Lord, Athens, 23 August 1889.

The "Times" of the 19th instant having published a telegram from its correspondent at Rome stating that Phylloxera had made its appearance in the Morea, M. Gennadius telegraphed to his Government asking if this were true.

He was instructed to make public at once the most categorical denial of the truth of the report.

Mr. Consul Wood, of Patras, has sent me an official despatch asserting that there is no Phylloxera in the Morea; and M. Dragoumis, in mentioning the matter to me to-day, said that he presumed that the report had arisen from the fact that a vine cultivator near Patras had recently requested the Government to send an expert to look at his vines, which he feared were unhealthy; and that the specialist despatched by the Government had reported that though sickly the vines were perfectly free from the dreaded disease.

I have, &c.
(Signed) Edmund Monson.

The Marquis of Salisbury, K.G.,
&c., &c., &c.